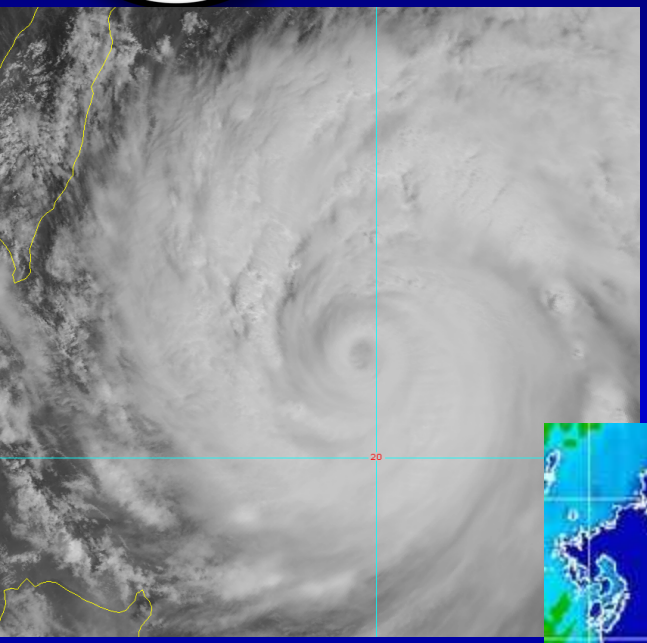
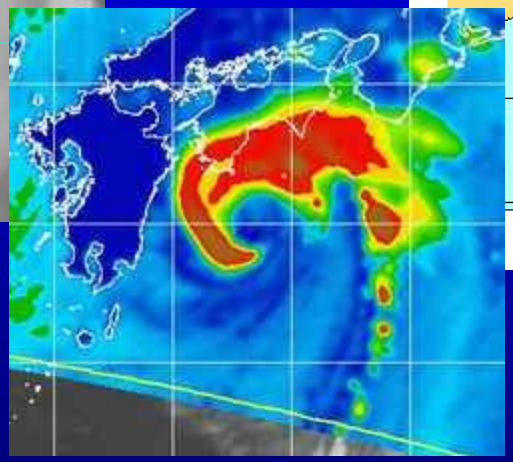
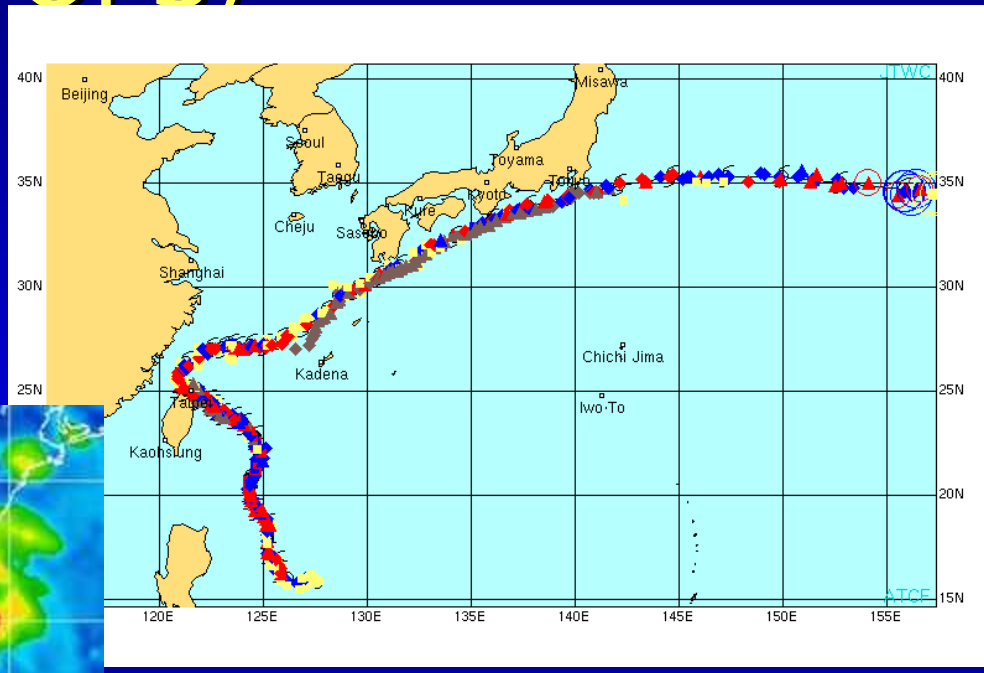
JTWC Satellite Operations (SATOPS)







ATCF

15W
SINLAKU

Capt Kathryn Payne

27 April

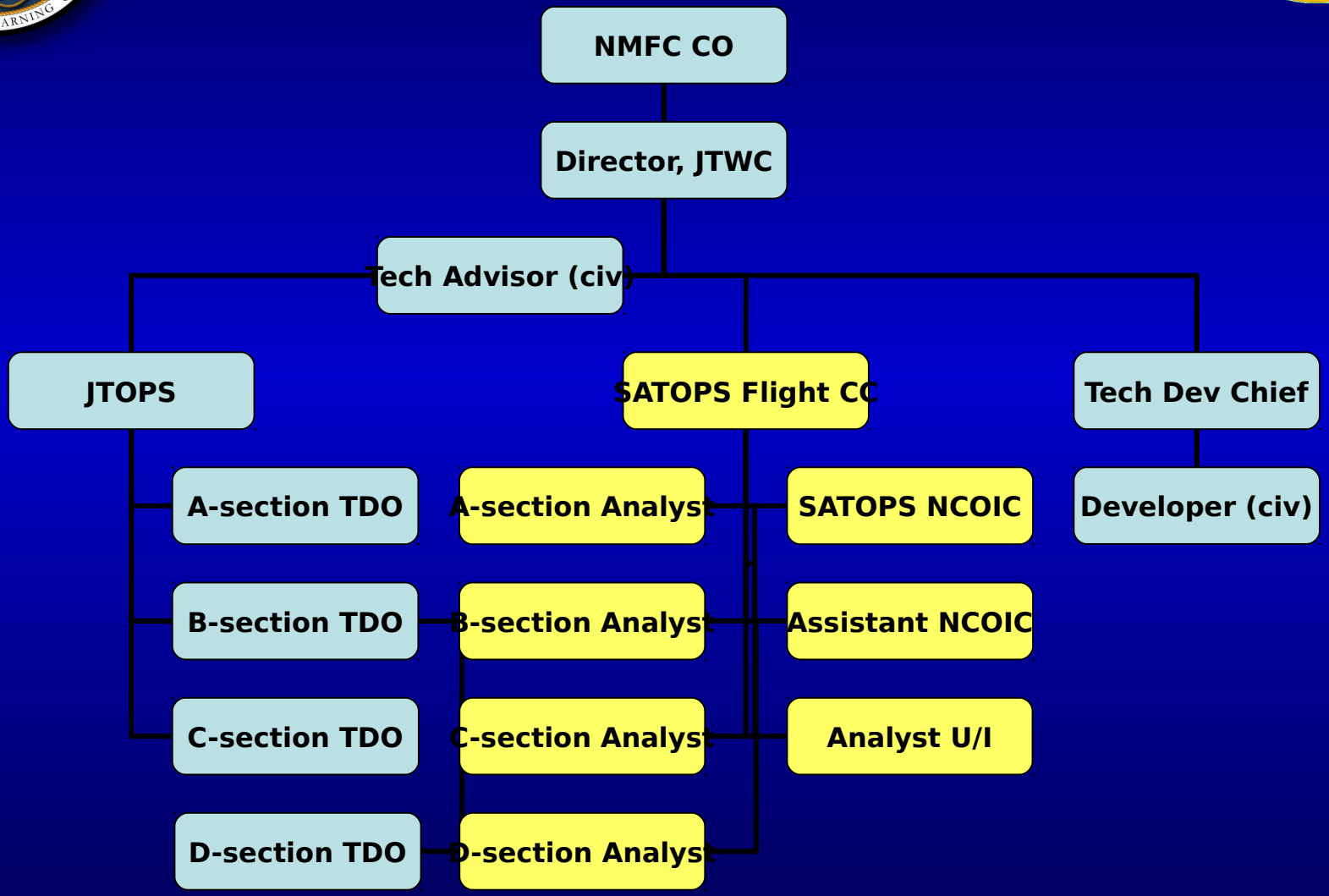
Overview

- SATOPS overview
- Satellite fix statistics 2008
- METSAT Conference Conclusions
  - Microwave Constellation
  - Quikscat
  - Improvements to Intensity Estimates

SATOPS Mission

- JTWC now has the sole Tropical Cyclone (TC) Reconnaissance Mission in USPACOM
- Support JTWC TC Forecast Operations
  - METWATCH AOR for disturbances
  - Evaluate disturbances for TC genesis
  - Assess TC position/intensity
  - Synergistic relationship with Typhoon Duty Officers (TDOs)
  - Post-storm F-deck QC
  - Transition research to operations through collaboration

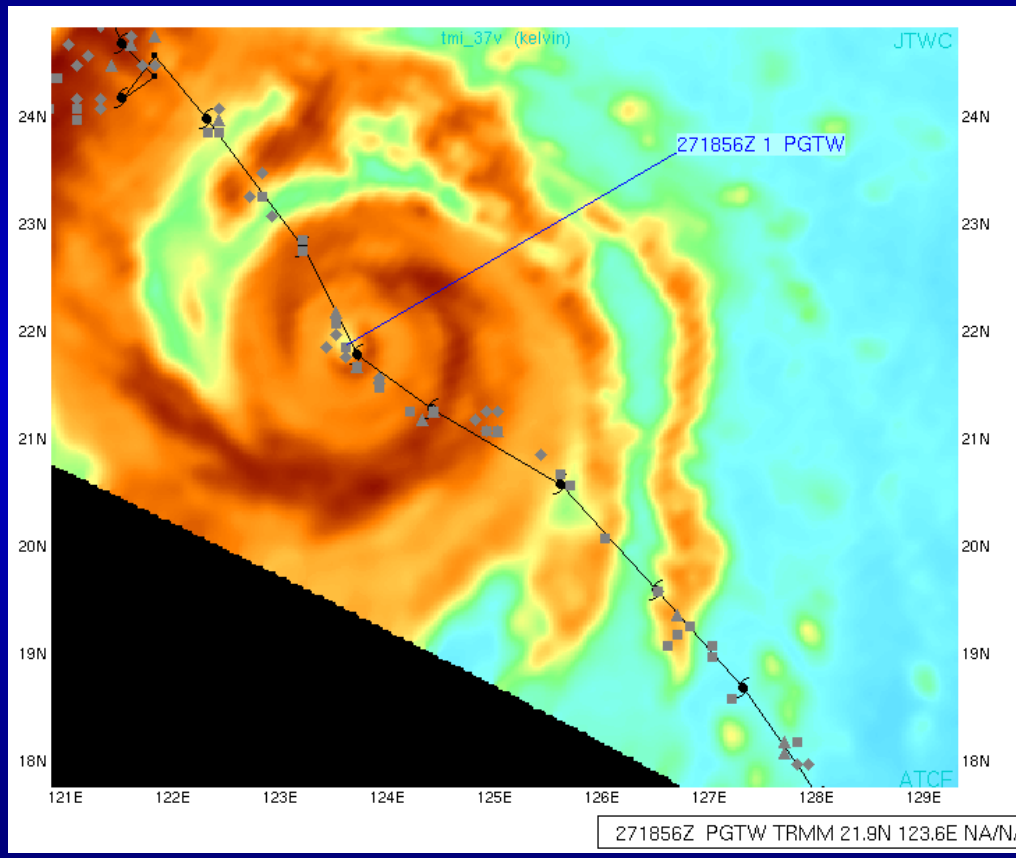
Organizational Structure



SATOPS: 1 AF Capt + 5 AF Enlisted + 2 AF civilians = 8 total

SATOPS Tools

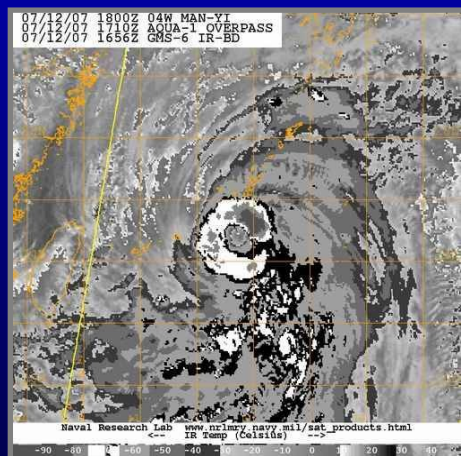
- USAF / MARK IVB Satellite System
- USN / FMQ-17 Satellite System
- Automated Tropical Cyclone Forecast System (ATCF)
  - Geo-referenced
  - From FNMOC/NRL
- FNMOC and NRL TC Web Pages



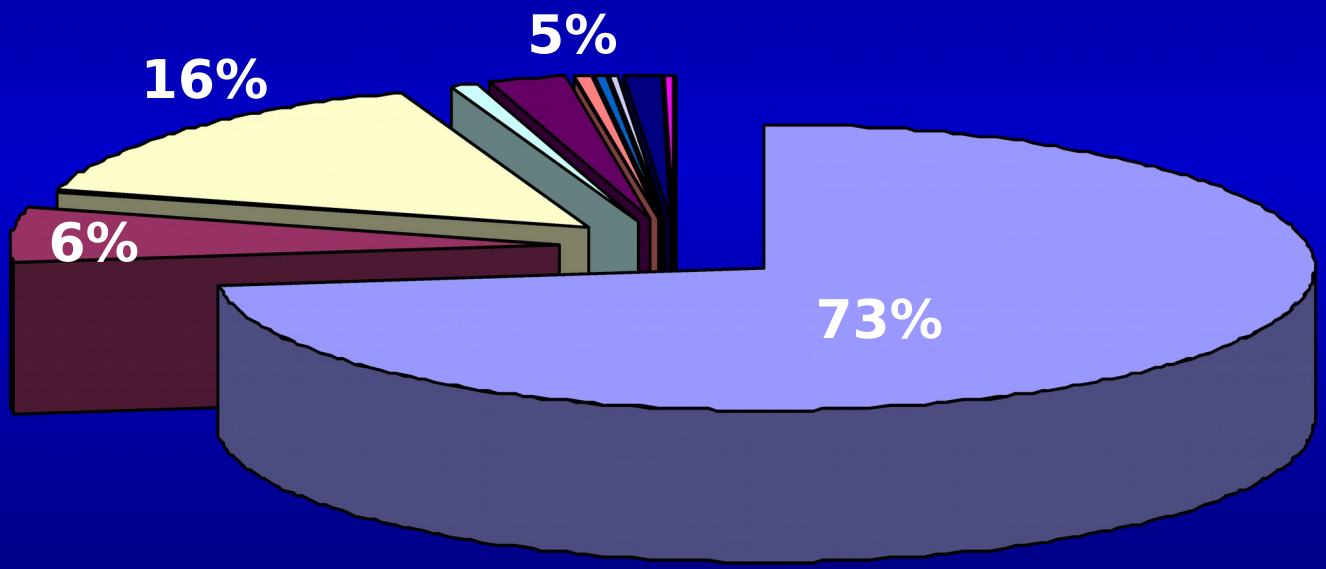
Fixing Process

- Position Fix every 3 hours
  - VIS, IR, Multi-spectral
- Intensity Estimate every 6 hours
  - Dvorak Technique
- Code and Transmit Bulletin
- Process Other Agencies' Fixes
- Radar/Dropsonde fixes
- Microwave Fixes as available
  - Now transmitted longline

```
TPXS10 PGTW 061816

A. TROPICAL CYCLONE 26S (JADE)

B. 06/1730Z

C. 17.2S

D. 48.7E

E. FIVE/MET7

F. N/A

G. IR/EIR

H. REMARKS: 38A/PBO SBC/ANMTN. DVORAK VALUES UNAVAILABLE DUE TO
LLCC OVER LAND.

I. ADDITIONAL POSITIONS:
   06/1324Z  16.4S  49.4E  AMSU
   06/1404Z  16.8S  49.7E  SSMS
   06/1500Z  16.7S  49.5E  SSMI


   UEHARA
```



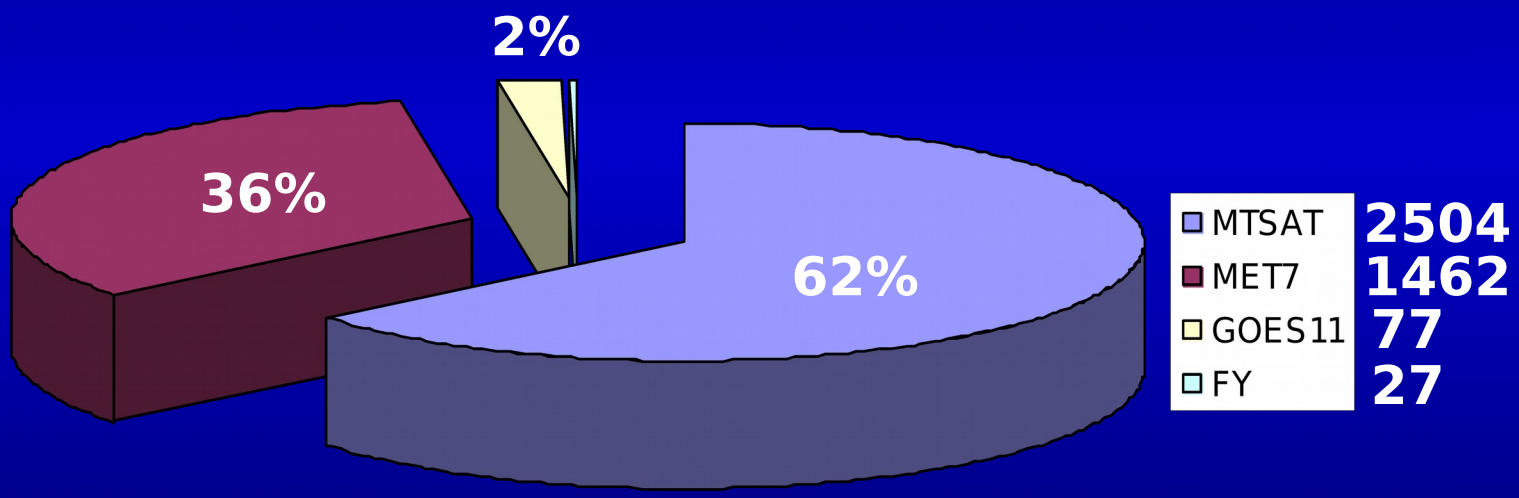
2008 Satellite Fixes By Agency



PGTW	9199
RJTD	744
KNES	1951
PHFO	96
FMEE	266
NFFN	69
ABRF	51
ADRM	29
APRF	126
DEMS	45
NZKL	5

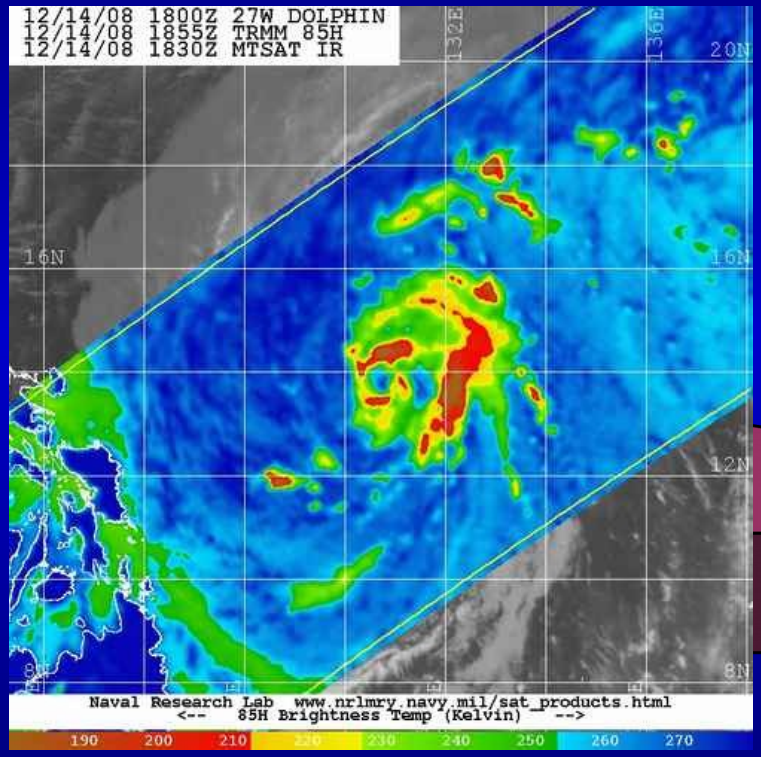
tal Satellite Fixes = 12,581

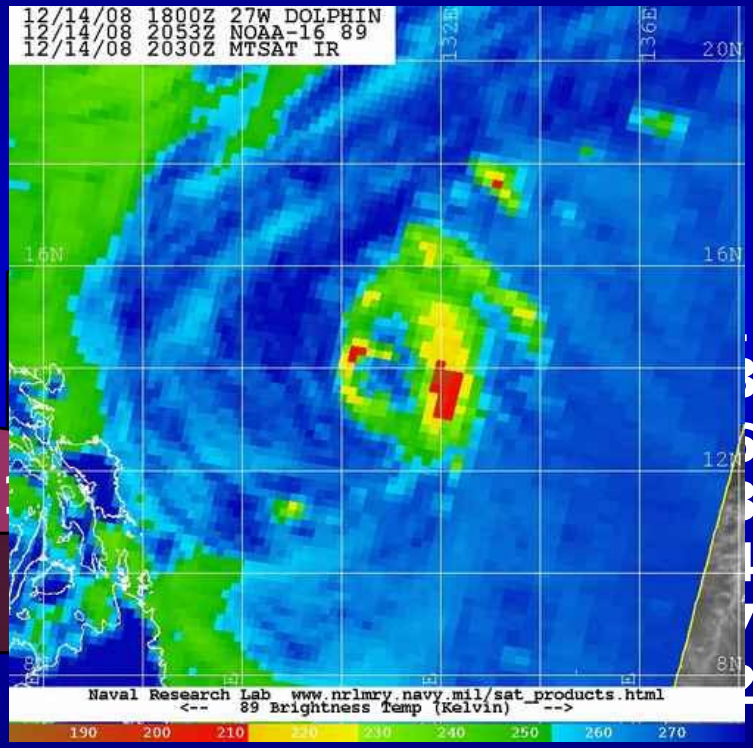
2008 Geostationary Fixes By Platform (PGTW)



tal Geostationary Fixes = 4,070

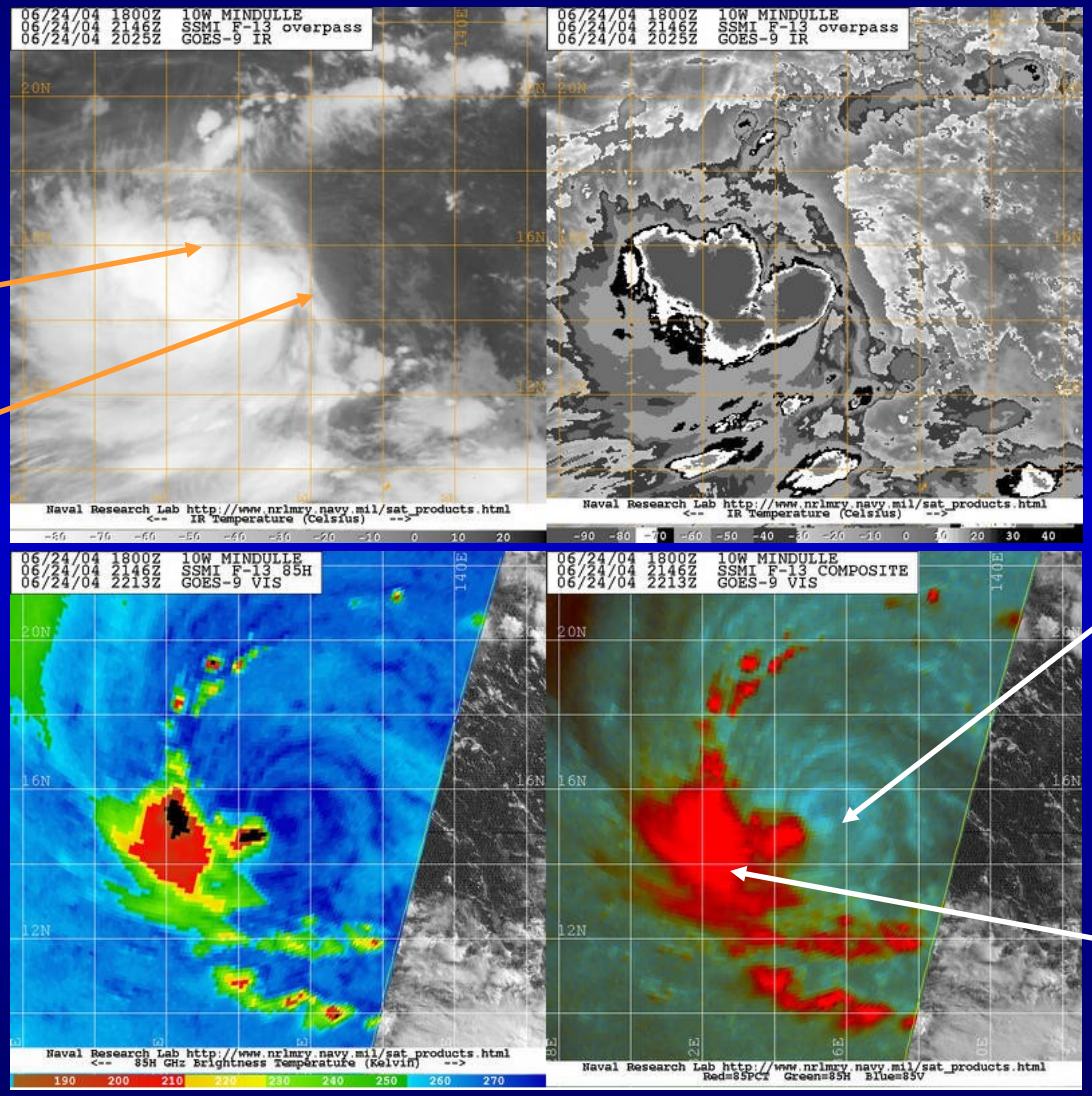
2008 Microwave Fixes By Platform (PGTW)





716
369
644
364
453
781
284

Microwave Fixes = 5,111→ Over half of PGTW fixes are now microw



Apparent LLCC

True LLCC

Exposed LLCC

Sheared Convection

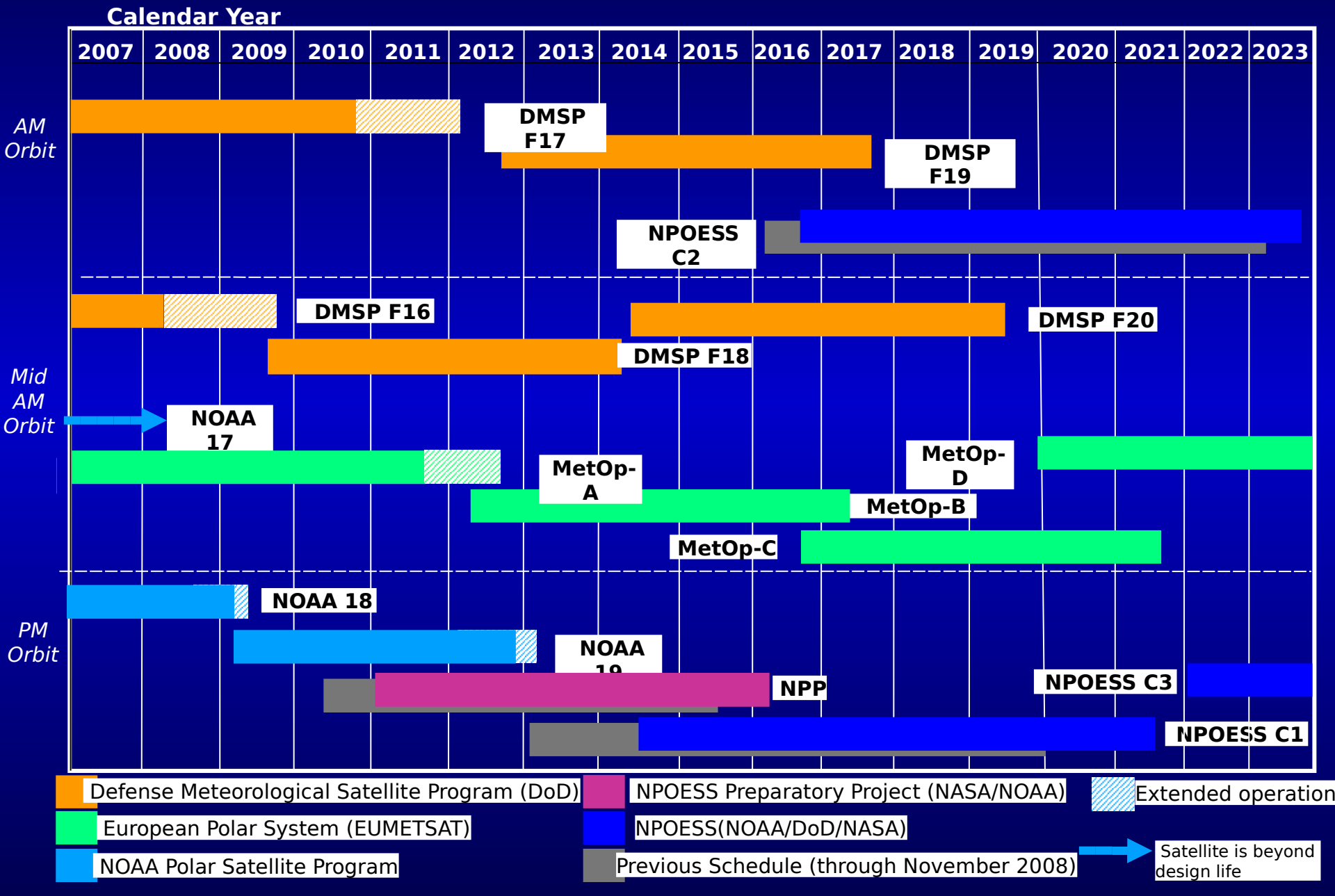
Slide courtesy of Jeff Hawkins, NRL

METSAT Conference Topics

- Future of Satellites Improvements to operational intensity estimates
- Participants
  - JTWC
  - NPOESS
  - NESDIS Satellite Analysis Branch
  - Naval Research Lab (NRL)
  - Fleet Numerical (FNMOC)
  - University of Wisconsin, CIMSS
  - NOAA-Science and Technology
  - Remote Sensing Systems
  - Lockheed Martin (Mark IVB)
  - SeaSpace (FMQ-17/TeraScan)
  - NWS Guam

Polar Satellite Programs

Slide courtesy of Maj Chris Dennison (NPOESS)

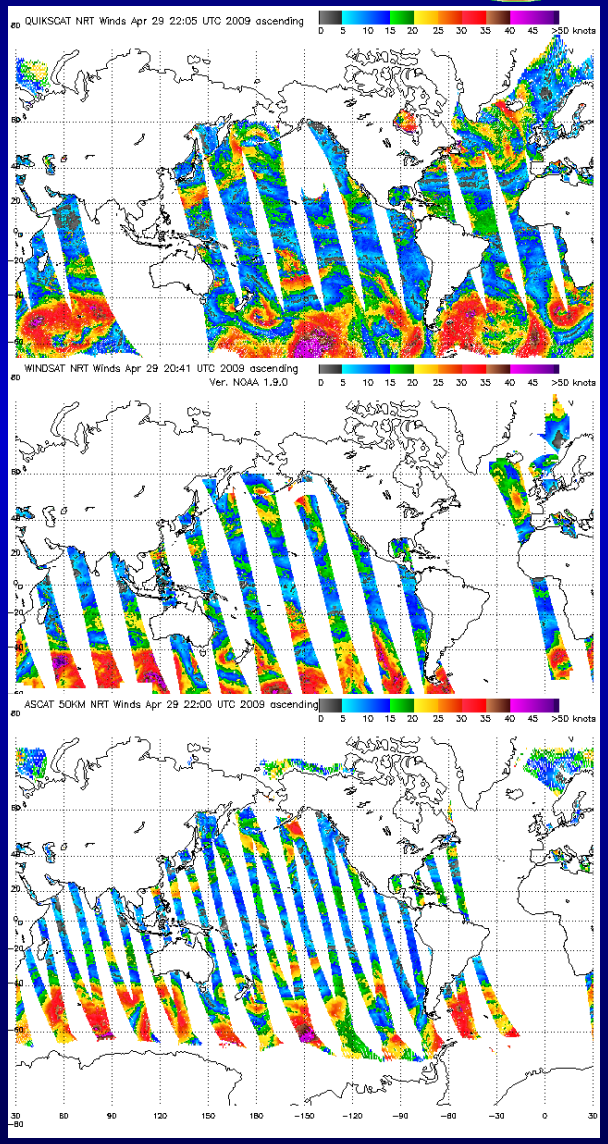


Future of Satellites-Conclusions

- JTWC needs assistance in quantifying satellite platforms' impact to operations
  - Ex: reduction in forecast errors, $ saved, sorties prevented
- JTWC needs a systematic way to advocate for satellite programs (ex. GCOM scatterometer/AMSRE)
- A temporal sampling requirement is needed for microwave imagery/sounders
  - Ex: imagery needed every 3 hours
- Request increased resolution for MIS (NPOESS) sensor

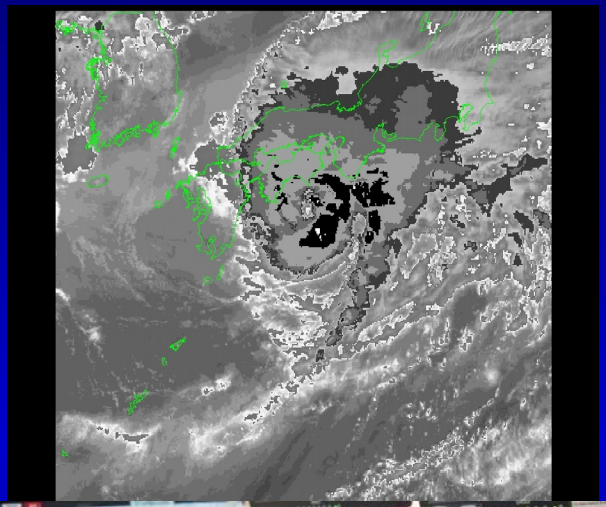
Quikscat

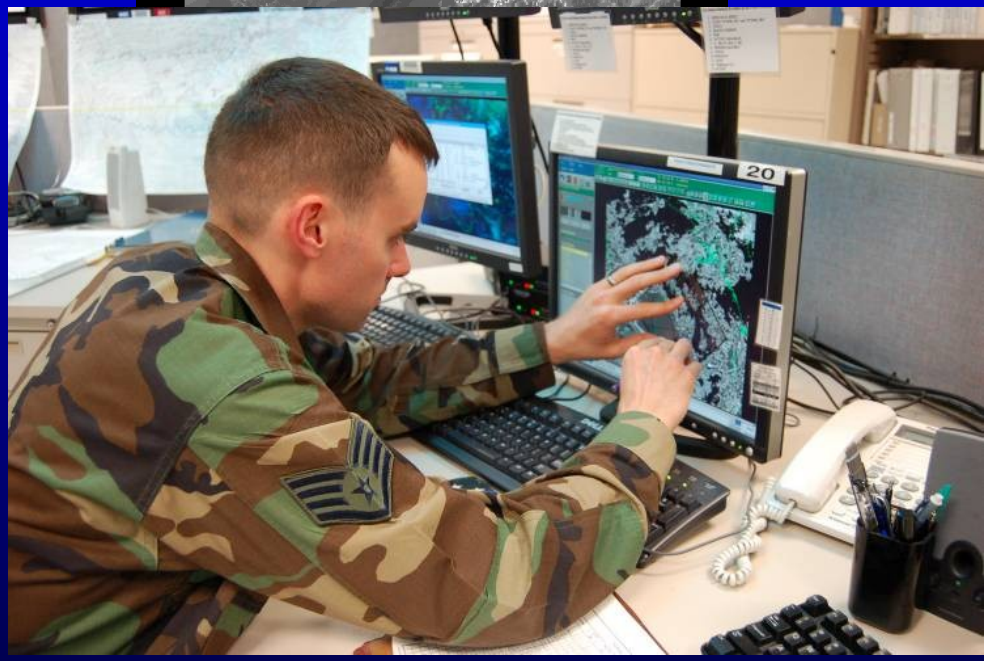
- Essential to JTWC operations
  - Synoptic Analysis
  - Initial warnings often based on quikscat winds
- Windsat/ASCAT- poorer spatial resolution
- First scheduled replacement- Dual Frequency Scatterometer (DFS) 2016
- Potential to run second ASCAT 20 minutes after 1st
  - ASCAT flies on MetOp series



Dvorak Technique

- Due to lack of aircraft recon, Dvorak primary tool for intensity estimates
- Known weaknesses in Dvorak present problems for TDO/analyst
  - Few updates to process in 30 years
  - Subjectivity
  - Rapid intensification
  - Weakening systems
  - Weak, developing systems
  - Midgets/pinhole eye





Improvements to Intensity Estimates

- Need correct baseline intensity to improve intensity forecasting
- Investigate use of CIMSS' SATCON (Satellite Consensus) intensity estimate as a supplement to Dvorak
  - Weighted consensus of 3 automated satellite intensity estimates
    - ADT (Advanced Dvorak Technique)
    - AMSU (CIMSS)
    - AMSU (CIRA)
  - Collaborate to improve understanding of these intensity estimates
- Priority for improvements concern storms less that 35 kts and rapid intensifiers

Questions

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